hand simultaneously with the image of the object-glass or speculum formed by the eye-piece; the diameter of that image is given at once by the divisions to $\frac{1}{500}$ of an inch, and can be readily estimated to half that value. The arrangement mentioned by "W. R." is no doubt very convenient, and quite adequate for his purpose; but for high powers I should suppose that the comparative coarseness of the engraved lines would make itself much more felt than it is in Mr. Berthon's invention, and the balance of economy is so greatly in favour of the latter in comparison with every contrivance with which I am acquainted, that I have no hesitation in saying that it ought to be in the hands of every amateur who cares to know the magnifying power of his telescope. It may be procured for five shillings, of Mr. Tuck, watchmaker, Romsey. T. W. WEBB

New Form of Cloud

THE kind of cloud described by M. André Poëy (NATURE, Oct. 19, 1871, p. 489) is by no means new or rare if I can judge correctly from the figure and explanation. It may often be seen on the lower part of the flank of a great rain or thunder cloud, and appears to arise from the dropping or subsidence of portions of the air heavily loaded with watery particles. My own impression is that it appears when the cloud is about to break up. M. Poëy will find the cloud described in the *Philosophical Magazine* for July 1857, where the name of *droplets* is given to the form, and its position in a thunder cloud indicated by a figure. J.

Spectrum of Blood

IN my letter, published in the last number of NATURE, I am strangely enough made to say that "we must not rely on *the* spectrum." This is an error of the printer. The sentence should have been:—"I have always argued that in such inquiries we must not rely on *one* spectrum, but compare the action of various reagents." H. C. SORBY

Broomfield, Sheffield, Oct. 28

Earthquake in Burmah

I HAVE not read in your "Notes" any record of the earthquake which was felt at daylight of the 16th February last in this city, in two successive and gentle but decided shocks, doing no damage, but which, from the files of the Calcutta *Englishman* of February 18, seems to have been severe to the N.W. of this, extending through Cachar, Silchar, Gowahatty, to Calcutta and Barrackpore.

This earthquake, you will observe, is synchronous with those of the western hemisphere already recorded by you.

CHARLES HALSTED

Mandalay, Burmah, Sept. 1

A Plane's Aspect

I AGREE with Mr. Proctor that the disuse of the term "position" in geometry would be a serious misfortune; happily, however, it is not its disuse, but the prevention of its misuse which is contemplated. I cannot agree with him that "position" is a word "which no one can misunderstand," for his own letter is a striking example of its being misunderstood, either by Mr. Proctor, or by others. "Aspect and slope," he tells us, "indicate two elements, which, together, *fix* the position" of a plane. Geometers, however, certainly understand, when a plane is said to be given *in position*, that something more than its aspect and slope may be regarded as known. Parallel planes have necessarily the same slope and aspect, but surely not the same position. To be told that, because its slope and aspect are invariable, the plane of Saturn's rings has a fixed position in space, notwithstanding that the planet moves bodily in its orbit, would scarcely satisfy a student of astronomy accustomed to geometrical precision.

There can be no doubt that "position" is the true English equivalent of the German word "Lage," and that no ambiguity of the kind above indicated could attach itself to the term, had we a suitable English rendering for the word "Stellung." I do not consider the term "aspect" to be perfect as an equivalent for "Stellung," but I have no hesitation in admitting that Mr. Laughton's suggestion is happier than any previous one I can remember. Mr. Proctor declares his intention of opposing the "use of the word 'aspect' in a sense not at present assigned nor properly assignable;" but when he wrote thus, he had not seen the letter of Mr. Wilson wherein the term "aspect" is very rigidly defined to be the direction of the normal. To me this very facility with which the word "aspect" lends itself to rigid definition, is a ground of objection against it. I have never seen Stellung defined in the manner in which Mr. Wilson has defined "aspect." Von Staudt, in whose admirable writings I first met the word, introduced it thus: "Parallel planes possess something in common, which may be regarded as appertaining to each one of them, and shall be called their 'Stellung;' the 'Stellung' of a plane, therefore, is determined by any plane which is parallel thereto, and two planes have the same 'Stellung' or different 'Stellungen' according as they are parallel to, or intersect one another."

That the term "aspect" is not sufficiently elastic to permit of its taking the place of "Stellung" in the above passage cannot, I think, be well maintained by Mr. Proctor, seeing that he has not himself hesitated to use it in two widely different senses in the following passage of his letter: "I can see no reason why 'aspect' should be regarded in a new and unfamiliar aspect." The expression "aspect of a plane," whether it be retained or not as the equivalent of the "Stellung einer Ebene," appears to me, I confess, to be much too good to be claimed by Mr. Proctor as indicative solely of *the direction of the projection of the normal upon a certain plane of reference.* I would suggest, in the interest of his twelve excellent books, that he might qualify "aspect," as thus defined, by an appropriate adjective, for the term is there used in a very technical sense indeed, and is not even applicable to all planes. Although Mr. Proctor can assign, for example, a southerly aspect to the face of a roof which has a slope of 30°, he would find some difficulty in describing the aspect of a roof which has no slope at all, whereas Mr. Wilson would without hesitation pronounce its aspect to be vertical.

Athenæum Club, Oct. 31 T. ARCHER HIRST

IT is due to my friend and your correspondent, Mr. Cecil J. Monro, of Hadley, to state that, to my knowledge, he was in the habit of employing the word "aspect" in this technical sense long before the publication of Mr. Laughton's letter, and I should not be surprised to learn that other geometers have used it before Mr. Monro.

I think Mr. Proctor will find few to agree with him in his condemnation of the word so used For myself I heartily agree with Mr. Wilson in the welcome he accords to this "old friend with a new face." C. M. INGLEBY

Highgate, N., Oct. 27

I AM glad to find, by Mr. Wilson's letter in NATURE for October 26, that the word "aspect," which I suggested, is accepted by him as satisfactory; as, in fact, the word wanted. But another correspondent in the same number, Mr. Proctor, pertinaciously insists on the superior merit of the word "position," to be used in the particular sense explained by Mr. Wilson in his former letter. In this I conceive Mr. Proctor is entirely wrong.

"In geometrical language"—I quote from Gregory's "Solid Geometry," 1845—"the position of a plane is determined by making it pass through three given points." Mr. Proctor says he "can see no reason why 'position' should be dismissed from the position it has so long occupied." No more can I. I would only call his attention to the fact that the meaning which he would assign to the word "position" is quite different from that which has been accepted, in a technical sense, by geometers, and in an everyday sense by everyday people.

Mr. Proctor's special objections to the word "aspect," rest, it seems to me, on a misconception of its meaning and familiar use. We speak of the aspect of a wall, but not of the aspect of a roof, nor of a hill. What the usage amongst builders in respect of roofs may be, I don't know, but geographers almost invariably speak of the "slope" of a hill, as, for instance, the southern slope of the Himalayas. Put into exact language, the aspect of a plane is the direction of its normal; and as parallel planes have parallel normals, any number of parallel planes have the same aspect, without reference to their position; but no two planes, parallel or not, can possibly have the same position.

The word "slope" is almost equally inadmissible; in the first place, it refers to some other plane, which is apt to cause

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confusion; and in the second, although all parallel planes have the same slope, any number of other planes not parallel can also have it; the word is therefore not sufficiently definite. "Tilt," a word spoken of by Mr. Proctor, as though it had been suggested, has no geometrical meaning whatever. As a substantive it is a "tent," or "awning;" it has also been sometimes used poetically as an equivalent to "tournament," and is, I believe, the familiar abbreviation of "tilt-hammer." These are its only meanings, and none of them apply to a plane.

I would only add that I do not quite see what the fact mentioned by Mr. Proctor, that he has written twelve books in the last six years—interesting as it may be from a bibliographical point of view—has to do with the matter.

Oct. 29 J. K. LAUGHTON

THREE elements are necessary to fix the position of a plane as I understand the word "position." If "aspect" and "slope" be the names of two of these, the third will be the perpendicular upon the plane from some fixed point. It is because the term "position" implies the fixedness of this third element that it is inappropriate to express my friend Mr. Wilson's meaning.

My friend Mr. Proctor will pardon me if I do not consider the question entirely settled by the fact that he has written perspicuously and explained clearly by the use of a term which fixes too much. With an improved scientific terminology, he will be able to make his next twelve books superior (if that be possible) to those he has written within the last six years.

"Aspect" and "slope" stand on the same footing, one connotes a reference to the points of the compass, the other to the horizon. Neither can be used in Mr. Wilson's sense without departing from their colloquial meaning, but it is perfectly competent for geometers to take a word from common conversation and give it a scientific meaning. Either of these words may be used in Mr. Wilson's test sentences. Parallel planes have the same slope, two slopes determine a direction, &c.

It is yet possible that some correspondent can suggest a better term, either one imported from ordinary life or one conceived for the purpose.

THE CORRESPONDENT WHO SUGGESTED "SLOPE"

Geometry at the Universities

PROF. THISELTON DYER has well pointed out a distinction which exists between the mathematical courses at Oxford and Cambridge. But his conclusion, that at Oxford "special attention to geometrical methods would pay very well," though acceptable in its way, falls far short of what I advocate. The great want at both Universities is a course of geometrical studies; and the proof that such a want exists is to be found in the fact that the geometrical treatises in use at either University, cover so very limited a range. There are not even any text-books on the geometry of the sphere, cone, cylinder, and like simple solids, or on such curves as the lemniscate, cycloid, and the simpler spirals. A few stray notes on these subjects may be found in some of the text-books, but not a thorough and systematic geometrical investigation of any of them. Geometrical treatises might with advantage range much further. A geometrical treatise on ellipsoids would be of immense use apart from its employment as a means of mental training. Geometrical treatises on paraboloids of both kinds, on hyperboloids of one sheet and of two sheets, on the various orders of ring-surfaces and screw-surfaces, and on many other tridimensional matters, would afford invaluable exercise to the student, besides having a real value to the scientific worker. I venture to express my conviction, that a course of such studies would tend to develop mathematical powers much more thoroughly even than the study of covariants and contravariants, Jacobians, Hessians, *et hoc genus omne*.

If there is one department of mathematical research in which our countrymen are fitted by their mental habitudes to distinguish themselves pre-eminently, it is precisely this neglected department of geometrical research. As it is, though we have geometricians of great power, no systematic geometrical work is done in England. Our treatises range only over the most elementary geometrical subjects, and even in discussing these subjects our writers are fain to accept the assistance of Continental geometricians. One would conceive that each of our Universities might yearly send out many who could treat of the elements of geometry without keeping a hand always on some French or German text-book.

Brighton, Oct. 27 RICHD. A. PROCTOR

DEEP-SEA DREDGING IN THE GULF OF ST. LAWRENCE

THE marine zoology of the deeper parts of the River and Gulf of the St. Lawrence has not been investigated until quite recently. This summer, under the auspices of the Natural History Society of Montreal, and in consequence of the kindness of the Hon. Peter Mitchell, Minister of Marine and Fisheries for the Dominion (who not only gave me facilities for dredging on board Government vessels, but also caused sufficient rope to be provided for the purpose), depths of from 50 to 250 fathoms were successfully examined. The greatest depth in the Gulf, to the west of the Island of Newfoundland, as given in the Admiralty charts, is 313 fathoms. It is thought that a general sketch of the results obtained may be of interest to the readers of NATURE.

The cruise lasted five weeks, the first three of which were spent on board the Government schooner *La Canadienne*, and the remaining two on the *Stella Maris*. The area examined includes an entire circuit round the Island of Anticosti, and extends from Point des Monts (on the north shore of the St. Lawrence) to a spot about half way between the east end of Anticosti and the Bird Rocks. As these investigations were almost necessarily subordinate to the special duties on which the schooners were engaged, in several cases the same ground was gone over twice.

The bottom at great depths generally consists of a tough clayey mud, the surface of which is occasionally dotted with large stones. So far as I could judge, using an ordinary thermometer, the average temperature of this mud was about 37° to 38° Fahrenheit, at least on the north shore. In the deepest parts of the river, on the south shore, between Anticosti and part of the Gaspe Peninsula, the thermometer registered a few degrees higher. Sand dredged on the north shore in 25 fathoms also made the mercury sink to 37° or 38°.

Many interesting Foraminifera and Sponges were obtained, but as yet only a few of these have been examined with any care. A number of Pennatulæ were dredged south of Anticosti; the genus has not been previously recorded, so far as I am aware, as inhabiting the Atlantic coast of America. They were found in mud, at depths of 160 and 200 fathoms, and it seems probable that this species, at least, is sedentary, and that it lives with a portion of the base of the stem rooted in the soft mud. *Actinia dianthus* and *Tealia crassicornis* were frequent in 200 to 250 fathoms. The Echinoderms characteristic of the greater depths are a *Spatangus* (specifically distinct from the common British species), *Ctenodiscus crispatus*, *Ophioglypha Sarsii* (very large), *Ophiacantha spinulosa*, and *Amphiura Holbollii*. Marine worms, of many genera and species, were both numerous and fine. Among the more interesting of the Crustacea were *Nymphon grossipes* (?) and a species of *Pycnogonum*. Several of the last named Crustaceans were taken at a depth of 250 fathoms, entangled on a swab, fastened in front of a deep-sea lead, which was attached to the rope, a few feet from the mouth of the dredge. This circumstance tends to show that the genus is not always parasitic in its habits. The Decapods, Amphipods, &c., at least those of greatest interest, have not yet been identified. Among the most noticeable of the marine Polyzoa are *Defrancia truncata*, and what appears to be a *Retepora*. Not many species in this group were obtained in very deep water, and those procured were, for the most part, of small size. About six species of Tunicates were collected. Being anxious to have Mr. J. Gwyn Jeffreys' opinion upon the various species of Mollusca during his visit to Montreal, I studied these carefully first, and submitted the whole of them to him for examination. Twenty-four species of Testaceous Mollusca were obtained at depths of from 90 to 250 fathoms. Nearly all of these are Arctic forms, and eleven of them are new to the continent of America.

The following are some of the most interesting of

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